

## Effect of Nano-Alumina on the Mechanical Properties of Cold Recycled Asphalt

**Authors :** Shahab Hasani Nasab, Aran Aeini, Navid Kermanshahi

**Abstract :** In order to reduce road building costs and reduce environmental damage, recycled materials can be used instead of mineral materials in the production of asphalt mixtures. Today, in most parts of the world, cold recycled asphalt with bitumen emulsion, has acceptable results. However, Cold Recycled Asphalt have some deficiency such as stripping, thermal cracking, and rutting. This requires the addition of additives to reduce this deficiency of recycled pavement with emulsified asphalt. In this research, nano-alumina and emulsified asphalt were used to modify the properties of recycled asphalt mixtures according to the technical specifications and the operation of cold recycling. Marshall test methods, dynamic creep test, and resiliency modulus test has been used to obtain the nano-alumina's effects on asphalt mixture properties. The results show that the addition of nano-alumina would reduce the Marshall stability in samples but increases the rutting resistance. The resiliency modulus increases significantly with this additive.

**Keywords :** cold asphalt, cold recycling, nano-alumina, dynamic creep, bitumen emulsion

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